

Robust and specific personality traits as predictors of adolescents' final grades and GPA at the end of compulsory schooling

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Abstract The study investigated the predictive value of robust and specific personality traits in adolescents ($M_{\text{age}}=14.7$ years), in explaining their academic achievement at the end of basic compulsory schooling. Personality data were obtained through self, maternal, and peer reports using the Inventory of Child/Adolescent Individual Differences. Adolescent gender and maternal education predicted 36, 26, 19, and 26 % of the variance in the final grades in Slovene, English, and mathematics and the overall GPA, respectively. Personality ratings by each of the three groups of informants substantially improved the prediction of students' academic achievements, over and beyond gender and maternal education. The robust trait scores contributed to significant increments in the variance explained, across the academic achievement indicators, ranging from 8 to 17 % (self-report), 15 to 24 % (maternal report), and 20 to 32 % (peer report). Conscientiousness was consistently the most powerful predictor of students' academic success and extraversion was negatively associated with all achievement indicators. The study provided support for a relatively stronger predictive utility of specific, rather than robust personality traits. Likewise, peer ratings of the students' personality provided relatively larger increments in variance explained in academic achievements than maternal and self-ratings; in general, the personality trait ratings added more to the prediction of mathematics grades and the GPA relative to the prediction of success in languages. Among specific traits, subjectively perceived student intelligence was the most powerful and consistent predictor of final grades and GPA.

Keywords Adolescence · Basic compulsory school · Academic achievement · Personality traits · Multiple informants

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Introduction

Understanding the major predictors of individual differences that contribute to academic achievement, has been a source of concern to educationalists for decades, because knowledge of the relevant factors that influence academic performance has important implications for learning, education, and job opportunities (e.g., Chamorro-Premuzic and Furnham 2003; Laidra et al. 2007; O'Connor and Paunonen 2007). Many factors have been identified that are related to academic achievement, including personality traits which explain significant portions of academic success independently of intelligence (e.g., Bratko et al. 2006; DiFabio and Palazzeschi 2009; Laidra et al. 2007; Leeson et al. 2008; Poropat 2009; Steinmayr et al. 2011; Puklek Levpušček and Zupančič 2009a; Puklek Levpušček et al. 2012). Personality traits may direct an individual's choice and level of persistence to engage in intellectually stimulating activities and affect certain habits that have an influence on academic success (Rothstein et al. 1994). Personality traits also reflect on an individual's typical performance, i.e., predicting what someone will do rather than what he or she can do as reflected in ability test scores (Furnham and Chamorro-Premuzic 2004).

Studies that examine the relationship between personality traits and academic achievement generally operate under the framework of the five-factor model (FFM). The five robust personality factors residing at the highest level of the personality trait hierarchy in adults comprise extraversion, agreeableness, conscientiousness, neuroticism, and openness (McCrae and Costa 1997). A similar FFM structure emerges in parental and teacher ratings of school-age children and adolescents or in self-ratings by adolescents (Halverson et al. 2003; Mervielde et al. 1995; Mervielde and De Fruyt 2002), but it does not become fully congruent with the adult structure until mid-adolescence (Allik et al. 2004). However, the number of factors in the pre-adult personality trait organization differs somewhat across studies and may depend on the age of the targets, the informants providing personality data (e.g., self-, peer, parent, teacher reports), and the assessment tools that are employed (Markey et al. 2004; Mervielde et al. 1995; Mervielde and De Fruyt 2000; Knyazev et al. 2008; Zupančič et al. 2009).

Some of the FFM traits have been found to be more consistent than other traits, in predicting academic achievement in adolescents. Conscientiousness has been identified as particularly relevant to academic success (Bratko et al. 2006; Laidra et al. 2007; Steinmayr et al. 2011; Trautwein et al. 2009). The relationship has often been explained in terms of motivation, academic effort and performance in school. Conscientious students who tend to be well organized, systematic, achievement oriented, precise, responsible, and hardworking, put more effort into their academic work, are better in regulating their effort, and thus are more likely to manage academic assignments more successfully than their less conscientious peers (Bidjerano and Dai 2007; Nofle and Robins 2007; Trautwein et al. 2009). Studies examining the openness (or openness/intellect) factor in predicting academic performance have produced mixed results (O'Connor and Paunonen 2007). Openness has been usually found to be positively related to academic performance (Barbaranelli et al. 2003; Farsides and Woodfield 2002; Gilles and Bailleux 2001; Laidra et al. 2007; Puklek Levpušček and Zupančič 2009a; Puklek Levpušček et al. 2012; Steinmayr et al. 2011), but several authors have failed to replicate a significant association between openness and academic performance (e.g., Busato et al. 2000; Chamorro-Premuzic and Furnham 2003). Curiosity and the need for intellectual experience may contribute to more cognitive investment and effective knowledge acquisition in "open" individuals (Chamorro-Premuzic and Furnham 2006), but their creative and imaginative nature may also be disadvantageous in some academic settings, particularly when students are required to perform systematically, dutifully, in an

organized manner, and to reproduce curricular content rather than produce divergent responses or novel solutions (Chamorro-Premuzic and Furnham 2003). Extraversion which includes characteristics such as an active, outgoing, and sociable nature has been found to change from having a positive effect on academic success in childhood (Laidra et al. 2007; Mervielde et al., 1995) to a negative one in adolescence (Bratko et al. 2006; Furnham et al. 2002; Laidra et al. 2007; Puklek Levpušček and Zupančič 2009a; Puklek Levpušček et al. 2012). The negative link may be a result of extraverted students spending more time socializing and less time studying (Chamorro-Premuzic and Furnham 2003; Smrtnik Vitulić and Zupančič 2010). Neuroticism, which is characterized by anxiety, irritability, moodiness, and insecurity usually shows either no significant relations (Barbaranelli et al. 2003; Bratko et al. 2006; Puklek Levpušček and Zupančič 2009a) or low negative associations with school grades (Gilles and Bailleux 2001; Laidra et al. 2007; Steinmayr et al. 2011). Specifically, high levels of anxiety may impair students' cognitive performance under academic test conditions (Chamorro-Premuzic and Furnham 2003). Agreeableness which reflects qualities such as kindness, cooperation, amiability, and sociability may predict school success in children (Laidra et al. 2007) but is rarely related to academic achievement in adolescents or emerging adults (Bratko et al. 2006; Chamorro-Premuzic and Furnham 2003; O'Connor and Paunonen 2007; Steinmayr et al. 2011).

Scarce research has centered on relationships between academic achievement and specific personality traits at the lower level of the personality hierarchy (Chamorro-Premuzic and Furnham 2003; Gray and Watson 2002; Lonsbury et al. 2003; Smrtnik Vitulić and Zupančič 2010). Nevertheless, investigating the role of specific traits in academic achievement is important since it may provide information about specific characteristics and processes that help explain the associations of robust personality traits with academic achievement and thus, reduce speculative interpretations about their predictive nature. Students with similar robust trait scores are likely to have different combinations of specific trait scores, and some constituents of the same robust trait may be more relevant for predicting academic achievement than others (Chamorro-Premuzic and Furnham 2003; O'Connor and Paunonen 2007). Specific traits associated with striving for achievement and self-discipline, according to self-reports from emerging adult students (Chamorro-Premuzic and Furnham 2003; Gray and Watson 2002) and maternal ratings of mid-adolescents (Smrtnik Vitulić and Zupančič 2010), for example, accounted for the relationship between conscientiousness and academic achievement. As for the other specific traits of the FFM, the results of the extant studies are inconclusive and need further inquiry (O'Connor and Paunonen 2007). Except for Lonsbury et al. (2003) who focused on specific traits outside the FFM, previous research provided information on the role of specific traits associated with academic achievement in upper secondary school or post-secondary school students. We thus examined the predictability of academic achievement in early adolescents (basic compulsory school students) using both the robust personality traits and their specific constituents, in order to determine which specific components of the robust traits are related to academic success.

In an extension of previous studies, we collected personality data on students from multiple data sources. Relevant information on adolescents can be obtained by self-reports, reports by parents, teachers, friends, classmates, or others who know the targets well. Trait ratings by multiple informants always differ to some extent, either because the observers perceive the target's characteristics subjectively, or do not know them equally well, or they are involved in different relationships with the target; furthermore, an individual's behavior varies across different contexts (e.g., Funder and West 1993). However, assessments of the same individuals by different informants may provide more accurate and valid information about the targets' personality than ratings by single informants. It was also suggested that personality data

provided by multiple sources augment the validity of personality trait scores in explaining academic achievement (grade point average (GPA)) of secondary-school students (ages 15 to 18), over the prediction based on one data source. Peer ratings improved the prediction of GPA over personality self ratings in both Croatian and Slovene students (Bratko et al. 2006; Smrtnik-Vitulić and Zupančič 2011). Likewise, maternal ratings of their early and mid-adolescents added significantly to the prediction of GPA based on personality self-ratings of basic compulsory students and secondary school students (Smrtnik-Vitulić and Zupančič 2011).

We accounted for several indicators of academic achievement in the present study. Most of the research in this field (e.g., Bratko et al. 2006; Farsides and Woodfield 2002; Laidra et al. 2007; Pullmann and Allik 2008; Steinmayr et al. 2011) has employed the GPA as a single indicator of students' scholastic achievement. Nevertheless, the GPA is not a unitary construct but reflects distinct and arithmetically averaged components of performance. Personality traits may, for example, contribute differently to different subject grades as demonstrated by Gilles and Bailleux (2001) with elementary school students. In order to improve the prediction of academic achievement by overcoming easily correctable limitations of past studies, researchers were encouraged to use specific components such as grades in specific courses, along with the GPA, as indicators of success in school (O'Connor and Paunonen 2007). We followed this suggestion in investigating the predictive relationship of personality traits in adolescents with academic achievement at the end of basic compulsory school in Slovenia. Along with a high GPA, very good final grades (assigned by the course teachers at the end of the school year) in Slovene, mathematics and foreign language (primarily English) at the end of the 9-year compulsory school are treated as an admission criterion for enrolment to the reputable secondary schools; i.e., the 4-year general high schools (Education System in Slovenia 2011; Puklek Levpušček and Zupančič 2007). Therefore, the students' final grades in Slovene, mathematics, and English were considered as specific and diverse indicators of academic achievement in our study; whereas the GPA was taken as an overall indicator of academic achievement because it "involves" all subject grades at the end of compulsory schooling. Since students with parents who have higher education are likely to be more successful academically than their peers with parents who have lower education (Sirin 2005; Peček et al. 2006), and since girls tend to perform somewhat better in school than boys (Puklek Levpušček and Zupančič 2009b; Razdevšek-Pučko et al. 2003), the student gender and maternal education were additionally included in the predictive analysis.

In sum, four research questions concerning early adolescents' personality traits as predictors of their academic success, over and beyond gender and maternal education were addressed: (1) How much do the robust and specific trait ratings add to the prediction of academic achievement?; (2) Which of the robust traits are significant predictors of academic achievements and which of their constituents (specific traits) contribute to the predictability?; (3) Do the personality trait ratings by different informants (self, mothers, and peers) account for similar or different amounts of additional variance in explaining academic achievement?; (4) Do the trait ratings contribute to similar or different amounts of improvement in predicting various components of academic success (Slovene, English and mathematics grades and the GPA)?

Method

Participants

The participants were 174 target adolescents (61 % girls), aged 14.1 to 15.7 years ($M=14.7$ years, $SD=4$ months); they attended the last grade of one of 19 different classrooms

distributed across eight randomly selected Slovene basic compulsory schools (two classrooms per school) in different regions of the country. The students filled in a self-report version of the personality inventory. Their mothers ($N=167$) and classmates ($N=338$) also provided reports on personality of the target adolescents using the same instrument but in the other-report version. Each adolescent was rated by two randomly selected same-sex classmates who agreed to participate and the peer scores were aggregated to increase the reliability of the trait scores; with the same data set, the peer ratings were previously found in a significant agreement across the specific and the robust trait scores (Smrtnik Vitulić and Zupančič 2009). Educational level of the adolescents' mothers, ranged from 8 years of completed compulsory school to Ph.D., with a mean of 12.74 years of schooling ($SD=2.05$).

Measures

Academic achievement Students in Slovenia are assessed in each course by their course teacher using a five-level grading scale (1=not sufficient, 2=sufficient, 3=good, 4=very good, and 5=excellent). Several grades in each course are obtained over the school year through oral and written exams. They constitute a final grade at the end of the school year. Final grades in three core subjects (Slovene, English, and mathematics) were used as indicators of academic achievement in our study. Also, the GPA was calculated for each individual. The GPA accounted for students' final grades across eight courses—Slovene, mathematics, English, physics, chemistry, biology, history, and geography.

The students' average final grades were the following: 3.85 ($SD=1.06$) in Slovene, 3.51 ($SD=1.16$) in mathematics, and 3.80 ($SD=1.10$) in English, whereas the mean GPA was 3.86 ($SD=0.93$). Girls were graded somewhat higher in Slovene and English and had a higher GPA than boys ($M_{SLO}=4.06$ vs. 3.49; $t(208)=3.90$, $p<0.001$; $M_{ENG}=3.92$ vs. 3.61; $t(208)=1.98$, $p<0.05$; $M_{GPA}=3.95$ vs. 3.71; $t(208)=5.05$, $p<0.001$) but the final grades in mathematics were similar across gender ($M_{MAT}=3.32$ vs. 3.62; $t(208)=1.89$, $p>0.05$). The indicators of academic achievement were strongly correlated (all p values of <0.001): GPA–Slovene ($r=0.90$), GPA–English ($r=0.84$), GPA–mathematics ($r=0.88$), Slovene–English ($r=0.78$), Slovene–mathematics ($r=0.80$), and English–mathematics ($r=0.80$).

Personality traits An adapted and standardized Slovene version (Zupančič and Kavčič 2009) of the Inventory of Child/Adolescent Individual Differences (ICID; Halverson et al. 2003) was employed. It is a 108-item measure (in a self- or other-report form) of 15 specific personality traits. The items capture representative parental free descriptions of their children/adolescents, collected across seven countries (Kohnstamm et al. 1998) and are rated on a seven-point Likert-type scale (from 1=*not true for me (him/her)* to 7=*entirely true*).

Exploratory and confirmatory factor analyses of data on a standardization sample of Slovene children/adolescents (3- to 18-year olds) obtained through ratings from multiple informants (e.g., mother, father, teacher, and self-ratings by the adolescents) suggested that the 15 ICID scales form four correlated robust personality factors: extraversion (*Activity Level*, *Considerate*, *Open to Experience*, *Positive Emotion*, and *Sociable* scales), disagreeableness (*Antagonism*, *Negative Affect*, and *Strong Will*), conscientiousness (*Achievement Oriented*, *Compliant*, *Distractible-reversed*, *Intelligent*, and *Organized*), and neuroticism (*Fearful/Insecure* and *Shy*). The factors explain 92 % of the variance, they show factorial invariance across age groups and ratings by different informants, are strongly internally coherent, considerably stable over a period of one to 3 years, moderately stable across contexts, and demonstrate good criterion validity against measures of social competence, problem behavior, and interpersonal relationships (Zupančič and Kavčič 2009). As we relied

on the scoring key suggested by the Slovene ICID manual (Zupančič and Kavčič 2009), which provides an invariant factorial measure of all specific scales, intellect/openness was not considered as an independent factor in the present research. Unfortunately, an invariant five-factor structure that includes the openness factor (defined by the *Openness to Experience* and *Intelligence* scales) is obtained across ages and methods of assessment only when the *Compliant* and *Considerate* scales are omitted (Knyazev et al. 2008). Also, the FFM developed on the US age heterogeneous validation sample (parent ratings only) fitted the data well when the *Compliant* scale was omitted, resulting in the fifth Intellect factor described by the *Intelligence* scale only, whereas the *Considerate* and *Openness to Experience* scales loaded for extraversion (Halverson et al. 2003) as in the Slovene four-factor solution.

In the present study internal reliabilities (Cronbach's α s) for the robust scales of extraversion, disagreeableness, conscientiousness, and neuroticism scales were 0.85, 0.68, 0.85, and 0.72, respectively (self-ratings), 0.85, 0.64, 0.89, and 0.78, respectively (maternal ratings), and 0.89, 0.81, 0.94, and 0.80, respectively (peer ratings). The α s for the 15 specific scales ranged from 0.51 to 0.87 (self-ratings), from 0.64 to 0.92 (maternal ratings), and from 0.56 to 0.92 (peer ratings). Except for self-ratings and peer ratings of distractibility, the α s exceeded 0.60.

Procedure

All of the participants were fully informed about the purpose and methods of this study and their participation was voluntary. Written parental consent was ensured prior to data collection. The personality data were collected 3 weeks after the invitation for participation in the study. Only the students who provided signed parental consent within this period, agreed to participate themselves and filled in the ICID completely were included in the sample (35 % of all invited). The adolescents offered the ICID self-ratings and they were also rated by their classmates in the presence of a research assistant during regular school hours or, if requested by the school principal, immediately after their lessons. The completion of the inventory took about 20 min. Then, the mothers completed the ICID at home and returned it to school in a sealed envelope. All of the inventories were administered during the second semester of the school year. Only the completely filled out inventories by mothers and peers were considered in the statistical analyses. The final grades for the adolescents' were collected from the school records at the end of the school year.

Results

Correlations of students' academic achievements with gender, mothers' education and personality trait scores

Pearson correlation coefficients of the students' academic achievements (final grades in Slovene, English, and mathematics and the GPA) with gender, mother's education, four robust personality scale scores, and 15 specific trait scores obtained by each of the three groups of informants were calculated (Table 1). An inspection of the mean r s¹ shows that they were modest and consistently (across achievement indicators) lower for personality self-ratings than for ratings by mothers and peers. Student gender was significantly and

¹ Cohen (1988) suggested that values of r s of ≥ 0.10 and < 0.30 indicate relationships of small magnitude, and values between 0.30–0.49 and > 0.50 indicate a moderate and high magnitude, respectively.

Table 1 Correlations of students' academic achievements with gender, mother's education, four robust personality scale scores, and 15 specific scale scores as derived from self, mother, and peer ratings

	Slovene			English			Mathematics			GPA		
	Self	Mother	Peer	Self	Mother	Peer	Self	Mother	Peer	Self	Mother	Peer
Gender	0.26**			0.14*			0.12			0.12		
Mother's education	0.49**			0.53**			0.48**			0.41**		
Extraversion	0.10	0.15	0.16*	-0.01	0.04	0.13	-0.06	0.05	0.11	0.02	0.14	0.15*
Activity level	-0.10	-0.03	0.03	-0.09	-0.05	0.03	-0.12	-0.02	0.04	-0.09	0.03	0.08
Conscientious	0.20**	0.15*	0.20**	0.08	0.08	0.13	0.06	0.10	0.12	0.11	0.14	0.14*
Open to experience	0.21**	0.28**	0.23**	0.14*	0.14	0.23**	0.01	0.13	0.19**	0.16*	0.23**	0.23**
Positive emotion	0.08	0.16*	0.16*	-0.07	0.04	0.10	-0.08	0.05	0.08	-0.02	0.12	0.12
Sociable	0.05	0.07	0.09	-0.09	-0.02	0.06	-0.10	-0.02	0.04	-0.04	0.05	0.07
Disagreeableness	0.01	-0.19*	-0.15*	-0.03	-0.19*	-0.14*	-0.05	-0.19*	-0.14*	-0.03	-0.21**	-0.11
Antagonism	-0.16*	-0.27**	-0.22**	-0.11	-0.23**	-0.18*	-0.12	-0.25**	-0.18**	-0.17*	-0.28**	-0.18*
Negative affect	0.03	-0.19**	-0.15*	-0.04	-0.19*	-0.15*	-0.02	-0.15	-0.13	-0.00	-0.20**	-0.13
Strong will	0.12	-0.01	0.00	0.07	-0.02	-0.02	0.00	-0.07	-0.04	0.08	-0.03	0.03
Conscientiousness	0.34**	0.49**	0.51**	0.28**	0.43**	0.46**	0.29**	0.47**	0.48**	0.39**	0.54**	0.54**
Achievement oriented	0.22**	0.38**	0.42**	0.16*	0.30**	0.35**	0.22**	0.39**	0.39**	0.27**	0.43**	0.44**
Compliant	0.31**	0.39**	0.39**	0.24**	0.35**	0.35**	0.26**	0.32**	0.34**	0.33**	0.41**	0.38**
Distractible-rev.	0.20**	0.46**	0.45**	0.20**	0.41**	0.43**	0.17*	0.44**	0.45**	0.25**	0.49**	0.50**
Intelligent	0.47**	0.58**	0.59**	0.40**	0.52**	0.57**	0.37**	0.52**	0.59**	0.51**	0.62**	0.65**
Organized	0.18*	0.28**	0.43**	0.12	0.25**	0.36**	0.12	0.29**	0.39**	0.21**	0.31**	0.44**
Neuroticism	-0.09	-0.21**	-0.20**	-0.02	-0.18*	-0.18**	0.03	-0.14	-0.12	-0.10	-0.24**	-0.21**
Fearful/insecure	-0.12	-0.29**	-0.25**	-0.08	-0.29**	-0.26**	-0.04	-0.24**	-0.21**	-0.16*	-0.33**	-0.28**
Shy	-0.04	-0.10	-0.11	0.04	-0.04	-0.08	0.09	-0.02	-0.03	-0.02	-0.10	-0.11
Mean <i>r</i> (robust traits)	0.14	0.27	0.26	0.13	0.22	0.23	0.11	0.22	0.22	0.14	0.29	0.26
Mean <i>r</i> (specific traits)	0.17	0.25	0.26	0.13	0.20	0.23	0.12	0.21	0.22	0.17	0.26	0.26

Notes. Self personality self-ratings, mother maternal ratings of their adolescent child personality, peer peer ratings of adolescents' personality, mean *rs* averaged Fisher's *z*-transformed correlations for both robust and specific trait ratings

* $p < 0.05$; ** $p < 0.01$

modestly related to the grades in languages only, with girls obtaining higher grades than boys. Maternal education showed significant and moderate positive links with all indicators of adolescents' academic achievement.

Conscientiousness and its specific trait constituents were significantly associated with students' academic success across the achievement indicators and informants providing personality data on the adolescents (with two exceptions). The relationships ranged from low to high in magnitude. It is also of note that conscientiousness and all of its specific trait scores were at least moderately related to the students' GPA and that the correlations of the *intelligence* scale scores with all indicators of academic achievement were at least of a medium size. The remaining correlations of, either robust or specific traits scores with academic achievements were low and more often than not insignificant; whereas most of the significant associations were not consistent across the informants and/or over the achievement indicators. Consistent negative associations of students' *antagonism* and *fearful/insecure* scale scores with the achievement indicators were observed for personality ratings by others (mothers and peers) only.

Predicting students' academic achievements: Robust trait and specific trait models

In order to determine predictability of students' academic achievement, in particular, the incremental predictive value of personality trait ratings over students' gender and maternal education, series of multiple regression analyses were conducted. The predictors were entered into the analyses step-wise: adolescents' gender and their mother's education (years of completed schooling) were always entered in the first step and personality scale scores (for self, mother, and peer ratings separately) were introduced in the second step. The relationships of personality variables with indicators of academic achievement (final grades in Slovene, English, and mathematics and the GPA) were tested for robust and specific trait ratings separately. Additional clustered ("complex type") regression analyses in the Mplus 6 program (Muthén and Muthén 2010) were performed to account for the dependencies caused by the fact that several students attended the same school. The results obtained by this method were remarkably similar to the results of ordinary multiple regression analyses across the 24 models tested (three groups of informants, four achievement indicators, and two different sets of personality variables). Compared with the ordinary regression models, the AIC criterion, used in the clustered regression analyses identified the same models as optimal, differences from 0 to 3 % in terms of variance explained were shown and the same predictors were indicated significant. Due to the similar outcomes and our interest in testing the amount of incremental variance provided by personality ratings in explaining academic achievements, which cannot be estimated by the clustered analysis, we opted for the ordinary multiple regression models.

Table 2 displays a summary of the results from the analyses with all four adolescents' robust trait scores added in the second step; i.e., self-ratings (step 2a), maternal ratings (step 2b), and peer ratings (step 2c). In the first step, gender and maternal education collectively predicted 37, 26, 20, and 26 % of variance in students' Slovene, English, and mathematics final grades and the GPA, respectively. Although both gender and maternal education contributed to adolescents' academic achievement significantly, the latter was a stronger predictor. The introduction of personality self-ratings (Table 2, step 2a) significantly improved the predictions of grades in Slovene, English, and mathematics and the GPA by 8, 10, 13, and 17 %, respectively, beyond adolescents' gender and their mothers' education.

When maternal ratings of the students' personality were entered instead of self-ratings (Table 2, step 2b), the predictions improved significantly: the maternal ratings accounted for

Table 2 Multiple regression analyses with gender, maternal education, and four adolescents' robust personality traits (self, mother, and peer ratings) as predictors of grades in Slovene, English, and mathematics and the GPA

	Slovene				English				Mathematics				GPA		
	β	t	Model summary		β	t	Model summary		β	t	Model summary		β	t	Model summary
			R^2				R^2				R^2				
Step 1															
Gender	0.31	5.12***	Adj. $R^2=0.36$		0.18	2.70**	Adj. $R^2=0.26$		0.20	2.88**	Adj. $R^2=0.19$		0.16	2.51*	Adj. $R^2=0.26$
Maternal education	0.54	8.92***	$F(2, 172)=50.44***$		0.49	7.51***	$F(2, 172)=30.79***$		0.42	6.10***	$F(2, 172)=21.81***$		0.50	7.58***	$F(2, 172)=30.90***$
Step 2a															
Gender	0.29	4.66***	$R^2=0.49$		0.17	2.49*	$R^2=0.43$		0.19	2.73*	$R^2=0.33$		0.15	2.34*	$R^2=0.46$
Maternal education	0.48	8.12***	Adj. $R^2=0.47$		0.44	6.88***	Adj. $R^2=0.41$		0.36	5.57***	Adj. $R^2=0.31$		0.41	6.89***	Adj. $R^2=0.47$
Self-rated E	-0.20	-2.17*	$F(6, 168)=26.06***$		-0.28	-2.88**	$F(6, 168)=19.01***$		-0.36	-3.56***	$F(6, 168)=13.77***$		-0.36	-3.91***	$F(6, 168)=23.60***$
Self-rated DA	0.10	1.58	$\Delta R^2_{\text{self-rated}}=0.08***$		0.02	0.31	$\Delta R^2_{\text{self-rated}}=0.10***$		0.09	1.32	$\Delta R^2_{\text{self-rated}}=0.13***$		0.11	1.79	$\Delta R^2_{\text{self-rated}}=0.17***$
Self-rated C	0.36	4.66***			0.38	4.58***			0.44	5.20***			0.52	6.70***	
Self-rated N	-0.04	-0.44			-0.05	-0.56			0.02	0.23			-0.09	-0.98	
Step 2b															
Gender	0.23	4.05***	$R^2=0.55$		0.10	1.72	$R^2=0.47$		0.10	1.66	$R^2=0.42$		0.06	1.04	$R^2=0.52$
Maternal education	0.51	9.48***	Adj. $R^2=0.53$		0.48	8.26***	Adj. $R^2=0.45$		0.38	6.25***	Adj. $R^2=0.40$		0.45	8.11***	Adj. $R^2=0.50$
Mother-rated E	-0.19	-2.53*	$F(6, 167)=32.25***$		-0.34	-4.15***	$F(6, 167)=23.58***$		-0.32	-3.75***	$F(6, 167)=19.30***$		-0.28	-3.69***	$F(6, 167)=28.92***$
Mother-rated DA	-0.05	-0.91	$\Delta R^2_{\text{mother-rated}}=0.15***$		-0.04	-0.64	$\Delta R^2_{\text{mother-rated}}=0.16***$		-0.04	-0.57	$\Delta R^2_{\text{mother-rated}}=0.19***$		-0.02	-0.38	$\Delta R^2_{\text{mother-rated}}=0.24***$
Mother-rated C	0.41	5.67***			0.42	5.42***			0.50	6.14***			0.53	7.22***	
Mother-rated N	-0.11	-1.57			-0.17	-2.30*			-0.10	-1.31			-0.15	-2.11*	
Step 2c															
Gender	0.20	3.80***	$R^2=0.59$		0.06	1.04	$R^2=0.46$		0.09	1.44	$R^2=0.48$		0.04	0.77	$R^2=0.57$
Maternal education	0.38	7.08***	Adj. $R^2=0.57$		0.34	5.51***	Adj. $R^2=0.44$		0.24	3.92***	Adj. $R^2=0.46$		0.28	5.19***	Adj. $R^2=0.56$
Peer-rated E	-0.37	-4.18***	$F(6, 169)=38.58***$		-0.34	-3.39***	$F(6, 169)=23.29***$		-0.46	-4.60***	$F(6, 169)=24.98***$		-0.47	-5.24***	$F(6, 169)=36.65***$
Peer-rated DA	0.19	3.06**	$\Delta R^2_{\text{peer-rated}}=0.21***$		0.14	2.01*	$\Delta R^2_{\text{peer-rated}}=0.20***$		0.27	3.92***	$\Delta R^2_{\text{peer-rated}}=0.27***$		0.29	4.70***	$\Delta R^2_{\text{peer-rated}}=0.32***$
Peer-rated C	0.71	8.44***			0.67	6.97***			0.85	8.97***			0.89	10.39***	
Peer-rated N	-0.12	-1.62			-0.10	-1.23			-0.07	-0.79			-0.14	-1.91	

Notes: E extraversion, DA disagreeableness, C conscientiousness, N neuroticism, ΔR square change

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

15 % (Slovene), 16 % (English), 19 % (mathematics), and 24 % (GPA) of unique variance in their adolescent children's academic achievements. Peer ratings of the target adolescents' personality (Table 2, Step 2c) yielded even stronger increments in the prediction of grades in Slovene (21 %), English (20 %), and mathematics (27 %) and GPA (32 %) than the robust scale scores derived from self or maternal reports on the students' personality.

To compare the incremental value of adolescents' robust and specific personality trait scores in predicting their academic achievements beyond gender and maternal education, the two-step regression analyses were first carried out with all 15 constituents of the four robust traits entered in the second step. In terms of unique variance in academic achievements as explained by the adolescent personality, the predictive models accounting for all specific trait scores presented an advantage over the models based on the robust trait scores. However, a smaller number of robust traits were compared with a larger number of specific trait predictors and the robust trait models appeared relatively more stable than the specific trait models. This may result from multicollinearity of specific trait predictors belonging to the respective robust traits in the regression models; indeed, the ICID-specific trait constituents of the same robust trait were highly intercorrelated.

In order to avoid multicollinearity and to make the comparison between the models with robust traits and specific traits more straightforward, we followed the reviewer's suggestion and re-ran the analyses with only four specific personality traits, i.e., with one specific trait from each robust trait, which correlated highest with the respective indicator of academic achievement (see Table 1). With the exception of the correlations between the grade in mathematics and self-rated specific traits of extraversion and neuroticism (note that none of those associations was significant), the highest correlating specific traits for each robust trait were the same across the informants and indicators of achievement. For the sake of simplicity and better comparability over different informants, the same four specific traits that are used in all other models were also considered for predicting mathematics from self-ratings. The summary of the statistics is presented in Table 3.

Self ratings of four specific traits (Table 3, step 2d) suggested a significant increment in the variance explained, over and beyond the student gender and maternal education: 14, 23, 17, and 21 % in Slovene, English, mathematics, and GPA, respectively. Relative to self ratings, maternal ratings of adolescents' specific personality traits (Table 3, step 2e) contributed to somewhat higher increments in predicting Slovene (19 %), English (21 %) and mathematics (25 %) grades, and GPA (29 %). When peer ratings instead of self or mother ratings were entered (Table 3, step 2f), the prediction was even better: The targets' specific personality traits rated by peers explained 25 % (Slovene grades), 26 % (English grades), 37 % (mathematics grades), and 38 % (GPA) of unique variance in the students' academic achievements. In terms of the unique variance in academic achievement as explained by the personality of the adolescents, the predictive models accounting for only four specific trait scores seem to have an advantage over the predictive models including the four robust trait scores.

Single personality trait predictors of academic achievement in adolescents

Scores on the conscientiousness scale for adolescents, derived across the data sources, were the strongest single robust trait predictors of all their final grades and GPA (Table 2). Likewise, the conscientiousness constituent trait of *intelligence* was, among the four specific trait predictors entered into the regression models, the most powerful predictor of all grades and GPA across the informant ratings (Table 3).

The scores on the extraversion scale were consistently (across the informants and indicators of achievement) and negatively related to the students' academic achievement

Table 3 Multiple regression analyses with gender, maternal education, and four adolescents' specific personality (self, mother and, peer ratings) as predictors of grades in Slovene, English, and mathematics and the GPA

	Slovene			English			Mathematics			GPA		
	β	t	Model summary	β	t	Model summary	β	t	Model summary	β	t	Model summary
Step 2d												
Gender	0.27	4.83***	$R^2=0.55$	0.15	2.37**	$R^2=0.49$	0.19	2.88**	$R^2=0.37$	0.13	2.20*	$R^2=0.48$
Maternal education	0.45	7.86***	Adj. $R^2=0.54$	0.41	6.57***	Adj. $R^2=0.46$	0.41	6.10***	Adj. $R^2=0.35$	0.39	6.63**	Adj. $R^2=0.46$
Self-ratings			$F(6, 168)=33.16***$			$F(6, 168)=23.22***$			$F(6, 168)=16.63***$			$F(6, 168)=25.68***$
E (open to experience)	-0.17	-2.25*	$\Delta R_{\text{self-rated}}=0.14***$	-0.27	-3.26***	$\Delta R_{\text{self-rated}}=0.23***$	-0.38	-4.47***	$\Delta R_{\text{self-rated}}=0.17***$	-0.30	-3.80**	$\Delta R_{\text{self-rated}}=0.21***$
DA (antagonism)	-0.03	-0.54		-0.06	-1.01		0.00	0.01		-0.05	-0.87	
C (intelligent)	0.50	6.30***		0.50	5.82***		0.58	6.59***		0.62	7.71**	
N (fearful)	0.08	1.13		0.04	0.52		0.09	1.20		0.04	0.63	
Step 2e												
Gender	0.30	5.82***	$R^2=0.58$	0.19	3.38***	$R^2=0.52$	0.21	3.59***	$R^2=0.48$	0.17	3.22***	$R^2=0.58$
Maternal education	0.40	7.31***	Adj. $R^2=0.56$	0.39	6.50***	Adj. $R^2=0.50$	0.27	4.30***	Adj. $R^2=0.46$	0.32	5.82***	Adj. $R^2=0.56$
Mother ratings			$F(6, 168)=37.63***$			$F(6, 168)=28.72***$			$F(6, 168)=24.26***$			$F(6, 168)=36.69***$
E (open to experience)	-0.19	-2.73**	$\Delta R_{\text{mother-rated}}=0.19***$	-0.38	-5.09***	$\Delta R_{\text{mother-rated}}=0.21***$	-0.39	-5.12***	$\Delta R_{\text{mother-rated}}=0.25***$	-0.33	-4.79***	$\Delta R_{\text{mother-rated}}=0.29***$
DA (antagonism)	-0.13	-2.33*		-0.12	-2.06*		-0.13	-2.10*		-0.13	-2.41*	
C (intelligent)	0.55	6.36***		0.58	6.28***		0.69	7.17***		0.71	8.19***	
N (fearful)	0.06	0.81		-0.02	-0.22		0.07	0.95		0.04	0.55	
Step 2f												
Gender	0.22	4.20***	$R^2=0.62$	0.08	1.28	$R^2=0.52$	0.12	2.15*	$R^2=0.58$	0.08	1.47	$R^2=0.63$
Maternal education	0.33	6.15***	Adj. $R^2=0.61$	0.27	4.56***	Adj. $R^2=0.50$	0.15	2.59**	Adj. $R^2=0.57$	0.21	4.05***	Adj. $R^2=0.62$
Peer ratings			$F(6, 168)=45.03***$			$F(6, 168)=29.43***$			$F(6, 168)=37.68***$			$F(6, 168)=47.54***$
E (open to experience)	-0.28	-3.51***	$\Delta R_{\text{peer-rated}}=0.25***$	-0.27	-3.03***	$\Delta R_{\text{peer-rated}}=0.26***$	-0.40	-4.85***	$\Delta R_{\text{peer-rated}}=0.37***$	-0.37	-4.84***	$\Delta R_{\text{peer-rated}}=0.38***$
DA (antagonism)	0.01	0.26		-0.01	-0.12		0.10	1.73		0.07	1.32	
C (intelligent)	0.76	9.04***		0.75	7.88***		1.01	11.36***		0.97	11.68***	
N (fearful)	0.08	1.14		0.06	0.83		0.16	2.27*		0.09	1.40	

Notes: E extraversion, DA disagreeableness, C conscientiousness, N neuroticism, fearful/insecure, ΔR R square change

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

(Table 2). The *openness to experience* (representing a specific trait of extraversion) scale scores were inversely related to the students' grades over the indicators of academic achievement and across the informants providing the personality ratings (Table 3).

Scores on the disagreeableness scale based on peer ratings of the adolescents' personality, were predictive of all indicators of academic achievement in a positive direction (Table 2). However, the specific trait scores of *antagonism*, which among the disagreeableness trait constituents consistently (across the informants providing personality data) showed the highest correlations with all indicators of academic achievement (Table 1), significantly contributed to the prediction of all grades and GPA but only when rated by the students' mothers (Table 3); the predictive relations appeared in a negative direction.

Neuroticism based on maternal ratings was demonstrated as a significant robust trait predictor of adolescents' grades in English and GPA (Table 2); the predictive relations were established in a negative direction. The scores on the specific *fearful/insecure* scale, correlating higher with the indicators of academic achievement across the informants (with one exception, however; Table 1) than the other constituent scale scores of neuroticism, were not predictive of students' achievements, except for the peer-rated trait which significantly predicted the grade in mathematics in a positive direction (Table 3).

Discussion

The aim of this study was to determine the role of the robust and specific personality trait ratings in predicting adolescents' academic success at the end of compulsory schooling, over and beyond gender, and maternal education. The trait ratings were provided by multiple informants (self, maternal and peer report) using the ICID (Halverson et al. 2003; Zupančič and Kavčič 2009), whereas subject specific final grades (in Slovene, English, and mathematics), and the GPA were considered as measures of academic achievement. In particular, we intended to reveal the amount of variance in academic achievements explained by the robust trait and specific trait scores, and to determine which of the specific personality traits may contribute to the predictability of academic success based on the robust traits; we also sought to determine if the adolescent trait ratings by different informants provide different levels of accuracy in predicting academic achievement, and if the trait ratings offer a more powerful prediction of some academic outcomes as compared with others.

The predictive models with gender, maternal education, and adolescent personality traits across ratings by different informant groups explained substantial amounts of variance in the students' GPA and final grades in Slovene, English, and mathematics. The trait scores were suggested as important predictors of various academic achievements in our students, over and beyond their gender and maternal education. The incremental predictive power of personality trait scores in explaining student academic success was further compared between the robust trait and specific trait models; fair comparisons in regard to the number of predictors were considered by entering only one specific trait (which correlated highest with the respective academic achievement) from each robust trait into the regression analyses. Although this strategy is easy to understand and implement, it may not provide the combination of specific traits that accounts for the highest possible proportion of variance in academic achievements. In other words, because univariate and multivariate analyses reveal different significant trait predictors, it is highly probable that some other set of four specific traits would have explained even a higher proportion of variance in academic achievements. Nevertheless, in accordance with the findings in emerging adult students (Chamorro-Premuzic and Furnham 2003), our results indicated that the predictions based on

specific trait scores in parallel to those accounting for the robust trait scores consistently (across the informants and criteria indicators) provided a somewhat better accuracy in explaining students' academic achievement. The results may be due to the fact that students with identical robust trait scores have different combinations of specific trait scores and some of the specific traits may share more variance with subject-specific grades, and GPA than others.

The robust and four specific trait scores accounted for somewhat different amounts of unique variance in adolescents' academic achievement, depending on the informants providing personality data and the indicators of academic performance. Mostly in line with the predictability of GPA in both Croatian (Bratko et al. 2006) and Slovene (Smrtnik Vitulić and Zupančič 2010) secondary school students, personality ratings by mothers and/or peers consistently offered a more powerful prediction of all measures of academic achievement than did self-ratings. Socially desirable responses may deflate the validity of personality self-ratings, whereas the reports by others, especially peers, are less susceptible to distortions caused by "target-promotional" strategies (Bratko et al. 2006). Although there is a significant concurrent agreement between maternal and peer ratings of adolescents' personality obtained with the sample of the present study at two measurement occasions 2 years apart (Smrtnik Vitulić and Zupančič 2009), peer report on classmates seems to encapsulate even more personality variance shared with academic achievement of the targets across the academic subjects than maternal report. Most likely, peer ratings are based on observations of the targets' behavior in an academic context (school and classroom), whereas maternal ratings mostly rely on characteristics of their adolescent children as observed out of school; it thus seems meaningful that the trait ratings of the targets as observed in school show a stronger relation with their academically related outcomes.

Our study demonstrated that student trait ratings by different informants share somewhat more variance with GPA than with specific components of academic achievement. In addition, the prediction of student grades in mathematics based on personality traits, was slightly but consistently more accurate than the prediction of grades in languages. We presume that the differences in predictability of subject-specific grades may be due to differences in subject-specific motivation and competence beliefs, which mediate, at least partly, the effect of personality based on self-reports on corresponding grades (e.g., Puklek Levpušček and Zupančič 2009a; Puklek Levpušček et al. 2012; Trautwein et al. 2009). The subject-specific motivation and self-efficacy were indeed found to be more powerful predictors of basic compulsory students' achievement in mathematics than in maternal language according to the results of an independent Slovene follow-up study with early adolescents (Puklek Levpušček and Zupančič 2009a).

As similar results were demonstrated with regard to single trait predictors by different informant groups and across the indicators of academic achievement under investigation, the present study offered strong support to the claim that conscientiousness plays the most prominent role in academic achievement of adolescents (Bratko et al. 2006; Laidra et al. 2007; Smrtnik-Vitulić and Zupančič 2011; Poropat 2009; Steinmayr et al. 2011). However, our analysis at the specific trait level pointed out that ratings of (subjectively perceived) *intelligence*,² a constituent of conscientiousness in our study (see "Method"), substantially and most consistently contributed to all measures of academic achievement included. The finding seems to be robust in the Slovene educational system as, using the same personality inventory, remarkably similar results were suggested in first graders (assistant teacher report

² In models with five factors, the trait loads on intellect (Halverson et al. 2003), openness (Knyazev et al. 2008), or imagination (Mervielde and De Fruyt 2002).

on child personality), while controlling for child intelligence (Zupančič and Kavčič 2011), and secondary school adolescents (personality ratings by multiple informants, controlling for SES; Smrtnik Vitulić and Zupančič 2010). Students who perceive themselves or are perceived by others as being eager to learn, are learning oriented, and are quick to understand, tend to acquire academic content more effectively and consequently, perform better academically (e.g., Puklek Levpušček and Zupančič 2009a). We can also speculate that the adolescents' school grades over the academic year, upon which the final grades are based, may have served our informants as a standard for their ratings of the targets' intelligence.

Consonant with adolescent studies on relationships between personality and academic achievement (Barbaranelli et al. 2003; Bratko et al. 2006; Laidra et al. 2007; Puklek Levpušček et al. 2012; Smrtnik Vitulić and Zupančič 2010, Smrtnik-Vitulić and Zupančič 2011), low extraversion predicted all measures of achievement under the current study, irrespective of the informants who provided the data on student personality. Our findings suggested that low levels of *openness to experience*³ were predictive of students' better grades and GPA across the achievement indicators and the trait ratings provided by different informants. Maybe novelty seeking, a wide range of interests and an active imagination as captured by the respective ICID scale (Halverson et al. 2003) are associated with poor study habits and lead to engagement in activities other than the academic tasks required by the curricula, which in turn may contribute to students' lower academic grades. Also the creative and imaginative nature of "open" individuals may present a disadvantage in some academic settings, particularly when students are expected to give convergent answers rather than divergent ones (Chamorro-Premuzic and Furnham 2003).

Educational implications of adolescent neuroticism, agreeableness and their specific constituents are usually weak and unclear, at least in older adolescents and emerging adults (O'Connor and Paunonen 2007); the meta-analysis by Poropat (2009) further indicated that these relationships fall with increasing age and level of education. Our study with early adolescents likewise provided some support for disagreeableness as an important predictor of academic achievements but for peer ratings of adolescent personality only. Students perceived by their classmates as less agreeable were more likely to achieve better academically, whereas adolescent neuroticism scale scores as derived from maternal report were negatively linked to final grades in English and GPA. Among the specific traits of disagreeableness, adolescent *antagonism* as viewed by the mothers was consistently predictive of indicators of academic success. The students perceived by the adults as being uncooperative, discourteous, rude and aggressive may exhibit behavioral problems in the classroom, making learning more difficult for them. They are also less pleasurable to work with in the classroom, more disliked by peers and teachers (Rubin et al. 1998), and may have difficulties due to opposing teachers in performing academic tasks. All these may contribute to their poorer academic achievement in comparison to less antagonistic students. With regard to the constituent traits of neuroticism, adolescent fearfulness and insecurity in the eyes of the classmates appeared to be advantageous rather than disadvantageous in predicting students' grade in mathematics; the positive relationship suggests that students who are seen as easily upset, quickly distressed, worrisome and lacking self-confidence may benefit from their behavioral tendencies in academic subjects that rely on pure logical operations and perhaps require more individual, focused and quiet intellectual work than others.

³ In models with five ICID factors, the trait loads either on Openness (Knyazev et al. 2008) or Extraversion (Halverson et al. 2003).

Conclusions

Increasing knowledge of the factors predicting academic achievement has important implications for education. It allows educators to predict who will perform better or worse in a given school program and provides background to direct students towards programs in which they are likely to succeed (O'Connor and Paunonen 2007); teachers may be also advised to adjust their classroom work in order to compensate for individual students' weaknesses related to academic achievement and to encourage their strengths.

In our study adolescent robust and specific personality trait scores predicted various academic achievements at the end of basic compulsory schooling, over and above student gender and maternal education. The results suggest that the accuracy of prediction by personality traits depends on the informants providing personality data and the measures of academic success. An implication of the findings is that peer ratings are especially valuable when personality traits are used to predict academic outcomes and that the assessments by others who know the students well (e.g., mothers or classmates) offer more predictive information than adolescent self-reports. The trait scores obtained by multiple informants also offer a somewhat better utility when predicting grades in mathematics and GPA than grades in languages, whereas the four selected specific trait scores explain somewhat larger amounts of unique variance in academic outcomes than the robust trait scores. This suggests that school professionals may benefit from using specific personality scales rather than entire questionnaires in identifying sources of adolescent academic difficulties and/or for the purpose of educational counselling.

Across the data sources conscientiousness and its specific constituent of subjectively perceived *intelligence* were the strongest single predictors of all included final grades and GPA in our research. As personality traits assessed by the ICID appear considerably stable over childhood with an increasing stability into adolescence (Zupančič and Kavčič 2009), it is important to enhance the development of specific traits of conscientiousness, particularly learning orientation, eagerness to learn, intellectual engagement, and willingness to perform in cognitively challenging settings early in a child's life and across different contexts. Extraversion and the specific trait of *openness to experience* were also consistently predictive of students' grades and GPA, suggesting that extraverted adolescents, particularly those high in openness to experience (e.g., novelty seeking, a wide range of interests and an active imagination) would benefit from encouragements to spend enough time studying and focusing on academic matter, which in turn may improve their scholastic success.

There are several limitations to our study. We opted for a four-factor structure (extraversion, agreeableness, conscientiousness, and neuroticism) of the personality measure (the ICID) for several reasons (explained in "Method"), which imposes problems to the interpretation of the results in the framework of the typical FFM. Conscientiousness and extraversion of the ICID four-factor model were the strongest robust trait predictors of academic achievement, but were best represented by the specific traits of intelligence and openness to experience, respectively, which both typically belong to the openness factor. On the one hand, this may suggest that the specific traits, typically captured by the openness factor, are the most important predictors of adolescents' academic achievement indicators in our study. On the other hand, our results also indicate that other constituent traits, at least those of conscientiousness (e.g., achievement orientated, organized, and nondistractible) consistently show significant and noteworthy positive associations with the academic achievements. For simplicity and comparability of the robust and specific trait predictions, those robust trait constituents were not accounted for in the regression models, which certainly does not imply that they are not predictive of adolescents' academic success.

Along with a somewhat small sample, our data did not include important predictors of academic achievement reflecting students' capability to perform academically, such as intelligence, prior knowledge and skills. It considered solely personality trait scores (robust and specific) although those were obtained by multiple sources. Nevertheless, prior studies suggested that personality traits across students' ages affect academic achievements independently of intelligence (e.g., Bratko et al. 2006; DiFabio and Palazzeschi 2009; Laidra et al. 2007; Puklek Levpušček et al. 2012; Zupančič and Kavčič 2011), and that controlling for intelligence has only minor effects on the validity of the robust personality factors predicting academic achievement (Poropat 2009). Longitudinal data would further provide more information on the relationship between adolescent personality and academic achievement. By using a cross-lagged design, for example, the effect of earlier personality on later achievement and the influence of earlier achievement on later personality could be tested. Although we considered various indicators of achievement, all of them relied on teacher assessment, which is at least partly, subjective; however, a recent study with an independent sample of Slovene early adolescents that included a net of other predictors along with robust personality traits (self-report only), such as intelligence, parental, and teacher characteristics, yielded strongly similar predictions between final grades in mathematics and Slovene, and the National Examination Test scores in the two subjects (Puklek Levpušček and Zupančič 2009a; Puklek Levpušček et al. 2012).

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Current themes of research:

Emotions. Personality and academic achievement in childhood and adolescence.

Most relevant publications in the field of Psychology of Education:

- Smrtnik Vitulić, H., & Zupančič, M. (2009). Agreement between different groups of informants reporting on adolescents' personality. *Didactica Slovenica*, 24(3–4), 87–103.
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Current themes of research:

Life-span personality development and the role of personality traits in psychological adjustment.

Most relevant publications in the field of Psychology of Education:

- Knyazev, G. G., Zupančič, M., & Slobodskaya, H. R. (2008). Child personality in Slovenia and Russia: Structure and mean level of traits in parent and self-ratings. *Journal of Cross-Cultural Psychology*, 39, 317–334.
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